Log Event A

Borehole # 40-12-04

Borehole Information

Farm : S	**Tank :** S-112	**Site Number :** 299-W23-220
N-Coord : 35,897	**W-Coord :** 75,829	**TOC Elevation :** 663.00
Water Level, ft :	**Date Drilled :** 6/30/1978	

Casing Record

Type : Steel-welded	Thickness : 0.280	ID, in. : 6
Top Depth, ft. : 0	Bottom Depth, ft. : 125	

Cement Bottom, ft. : 130 **Cement Top, ft. :** 125

Borehole Notes:
This borehole was drilled in June 1978. The borehole was started with 18 ft of 8-in. surface casing and continued to a depth of 130 ft with 6-in. casing. The borehole was completed at a depth of 125 ft with 6-in.-diameter steel casing. The bottom 5 ft of the borehole was filled with grout. The 18 ft of 8-in. casing was withdrawn and the annulus between the permanent 6-in. casing and the portion of the borehole wall that was drilled with the 8-in. casing was grouted. The casing was not perforated. The casing thickness is assumed to be 0.280 in., on the basis of published thickness for schedule-40, 6-in. casing.

The top of the casing is the zero reference for the log.

Equipment Information

Logging System : 1	**Detector Type :** HPGe	**Detector Efficiency:** 35.0 %
Calibration Date : 04/1996	**Calibration Reference :** GJPO-HAN-5	**Logging Procedure :** P-GJPO-1783

Log Run Information

Log Run Number : 1	**Log Run Date :** 07/31/1996	**Logging Engineer:** Kim Benham
Start Depth, ft.: 126.0	**Counting Time, sec.:** 100	**L/R :** L **Shield :** N
Finish Depth, ft. : 76.5	**MSA Interval, ft. :** 0.5	**Log Speed, ft/min.:** n/a

Log Run Number : 2	**Log Run Date :** 08/01/1996	**Logging Engineer:** Kim Benham
Start Depth, ft.: 77.5	**Counting Time, sec.:** 100	**L/R :** L **Shield :** N
Finish Depth, ft. : 0.0	**MSA Interval, ft. :** 0.5	**Log Speed, ft/min.:** n/a

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Analysis Information

Analyst : H.D. Mac Lean

Data Processing Reference : P-GJPO-1787 Analysis Date : 05/21/1997

Analysis Notes :

The SGLS log of this borehole was completed in two logging runs. A centralizer was used for both runs. The pre- and post-survey field verification spectra for both logging runs met the acceptance criteria established for peak shape and system efficiency. The energy and peak-shape calibration from the field verification spectra that best matched the logging data were used to establish the channel-to-energy parameters used in processing the spectra acquired during the logging runs. There was negligible gain drift during the logging runs.

Casing correction factors for a 0.280-in.-thick casing were applied during the analysis.

Cs-137 was the only man-made radionuclide detected in this borehole. Cs-137 contamination was detected at the ground surface, at 1 ft, continuously from 2.5 to 4.5 ft, from 6.5 to 7 ft, and from 125.5 to 126 ft. Cs-137 concentrations within the borehole ranged from about 0.2 pCi/g (just above the MDL) to approximately 0.7 pCi/g at a depth of 3.5 ft. A higher apparent concentration of approximately 17 pCi/g was detected at the ground surface.

The log of the naturally occurring radionuclides shows a low K-40 concentration between the ground surface and a depth of 12 ft, an increase from 46 to 48 ft, decreased concentrations from 48 to 52 ft, and decreased again from 63 to 66 ft. The KUT concentrations increase below a depth of 66 ft.

The slight decrease in the U-238 concentration below a depth of 76 ft reflects different U-238 backgrounds measured during the separate logging runs. The U-238 measurement is predicated on the intermediate members of the U-238 decay chain being in secular equilibrium; however, the intermediate member Rn-222 is a gas and the concentration of this gas in the borehole environment does not necessarily remain constant between logging runs.

Details concerning the interpretation of data from this borehole are presented in the Tank Summary Data Report for tank S-112.

Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.